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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

HANDAL, KAITLY V

ART UNIT

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1723

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/590,640	Applicant(s) DAVIS ET AL.	
	Examiner KAITY V. HANDAL	Art Unit 1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 September 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 August 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8/23/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's arguments dated 9/9/2010 in response to the restriction requirement dated 7/9/2010 traversing the restriction requirement are found to be convincing in that Species B is a subspecies of Species A. Therefore, claims 1-19 are rejected herein.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 93, 92, 103, 107, 111, 124, 125, 126. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities: the specification is missing page numbers.

Appropriate correction is required.

Claim Objections

4. Claims 1-19 are objected to because of the following informalities: typographical errors in claims 1 and 19. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claim 7 recites the limitation "end blocks" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

8. Claim 9 recites the limitation "the output" in line 1 and "the valves" in line 2. There is insufficient antecedent basis for this limitation in the claim.

9. The term "a desired level of heat transfer" in claim 10 is a relative term which renders the claim indefinite. The term "a desired level of heat transfer" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite

Art Unit: 1723

degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The instant specification discloses that the tubes and manifolds can be made of stainless steel, metal alloys, ceramics, polymers and composites. Therefore, for prosecution purposes, the “desired level of heat transfer” is achieved by using tube material made of any of these materials in constructing the apparatus.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1-8, 10, 13-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Shah et al. (US 7,108,730).

With respect to claim 1, Shah teaches an apparatus comprising: a plurality of subsystem modules/(each module comprising tubes (1 & 5 & 8)) (Figures 1-2) operable in parallel (col. 8, lines 36-38) that execute at least a part of a process, each such module/tubes (1 & 5 & 8) comprising elongated reactor chambers (1 & 8) to perform a process, said subsystem module having first and second ends (as illustrated), such ends having apertures (2, 11, 12, 3) therein for admitting and releasing process fluids (oxidant, fuel, product gas); at least one manifolds (inlet lines of oxidant and fuel) connected (fluidly connected) to one end of each of such plurality of modules/tubes (1 & 5 & 8) for conducting at least one fluid stream/(oxidant or fuel) between a first one of

Art Unit: 1723

said process spaces/(fuel tube) (5) and a second one of said process spaces/oxidation chamber (1) of each such module/tubes (1 & 5 & 8); at least one fluid flow controller/valve for controlling the flow of process fluids through the manifold (col. 5, lines 23-26).

With respect to claim 2, Shah teaches wherein the chemical process is performed in a plurality of sub-processes (col. 7, lines 43-50), said plurality of subsystem modules/tubes (1 & 5 & 8) each comprises at least two elongated reactor chambers/(process chamber (8) and oxidation chamber (1)) one of said elongated reactor chambers (8) performing a first one of said sub-processes/(reforming) therein and the other (1) performing another sub-process/(oxidation) therein.

With respect to claim 3, Shah teaches wherein said device comprises a second manifold (outlet lines of oxidation chamber outlet (3) and process chamber exit (12)) connected to the other end of each of said subsystem modules/tubes (1 & 5 & 8). Limitations expressed in intended use language is not given weight in an apparatus claim given that it does not add any structural limitation to the claim.

With respect to claim 4, Shah teaches wherein at least a portion of one of said at least two chambers (1) is contained within the other (8) of said at least two chambers (1 & 5 & 8) (as illustrated).

With respect to claim 5, Shah teaches wherein said at least two elongated reactor chambers (1 & 5 & 8) are formed in the interior of elongated tubular members (104) (as illustrated).

With respect to claim 6, Shah teaches wherein at least one of said elongated tubular members (1) is contained at least in part within said other elongated tubular member (8) (as illustrated).

With respect to claim 7, Shah teaches wherein said tubular members have a generally circular cross section (as illustrated) and wherein they are mounted between the end blocks/manifolds in generally coaxial relation to one another (as illustrated in Figure 1).

With respect to claim 8, Shah teaches wherein fluid streams from said subsystem modules (1 & 5 & 8) are combined in fluid channels in at least one of said manifolds/(outlet lines are positioned in the outlet manifold (3 & 12 & 10) (as illustrated).

With respect to claim 10, Shah's apparatus comprises material that would provide the desired level of heat transfer since Shah uses metal alloys in constructing the apparatus (col. 4, lines 4-19), similar to the instantly disclosed apparatus.

With respect to claims 13-14, Shah teaches wherein the subsystem modules comprise a plurality of nested tubes (as illustrated).

With respect to claim 15, Shah teaches wherein said control/valve (col. 5, lines 23-26) consists of one or more arrays of valves.

With respect to claim 16, Shah teaches wherein processes selected from the group consisting of heat exchange/(inside heat exchanger (10)), flow mixing, and flow splitting are carried out in at least one of said manifolds/(exit manifolds (3 & 12 & 10)) (as illustrated in Figure 1).

Art Unit: 1723

With respect to claim 17, Shah teaches wherein at least one process stream/(inhibitor (9)) is divided into a plurality of streams/(divided amongst the plurality of modules comprising the combination of (1 & 5 & 8)) the flow in said streams being independently controlled by the control/valve (col. 5, lines 23-26), at least one of such streams (inhibitor and fuel) being further divided (inside fuel conduit (5) through fuel nozzles (6)) for communication with a plurality of such subsystem modules (1 & 5 & 8).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 9 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shah et al. (US 7,108,730), As applied to claims 3 and 10 above, and further in view of Hoch et al. US 2006/0052916 A1.

With respect to claim 9, Shah discloses all claim limitations as set forth above; Shah's apparatus further comprises an oxidation unit (heater) and a fuel reformer (col. 7, lines 43-70) and a control valve and a control system to ratio the inhibitor to the flow of fuel (col. 5, lines 23-26). Shah fails to explicitly teach providing a plurality of valves wherein the output of the device is controlled by selectively controlling the valves to change the operational status of at least one of said subsystem modules in response to demand, whereby the output of the device can be throttled while allowing the subsystem

Art Unit: 1723

modules to function generally at a desired output level. Hoch teaches an apparatus comprising a fuel processor/reformer (Figure 1, 112) generating hydrogen (120), a combustor (130) generating heat for the fuel processor/reformer (112), wherein the output/(hydrogen) (120) of the device/fuel processor (112) is controlled by selectively controlling the valves/(fuel, oxidant valves) to change the operational status of at least one of said subsystem modules/(fuel processor and/or combustor/(heater)) in response to demand (Figure 4) in order to control the operation of the power system (100) (Page 3, paragraph [0027]).

It would have been obvious to one having ordinary skill in the art at the time of the invention to provide Shah's apparatus with control valves for fuel and oxidant as a tool for controlling Shah's device and it would have been obvious to control the output of Shah's device selectively by controlling the valves to change the operational status of at least one of said subsystem modules in response to demand, as taught by Hoch, in order to control the operation of the power system.

Regarding limitations recited in claim 9 which are directed to a manner of operating disclosed device (i.e. output of device can be throttled), neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an

Art Unit: 1723

intended operation are of no significance in determining patentability of the apparatus claim.”

With respect to claim 11, Shah discloses all claim limitations as set forth above, Shah further teaches wherein the process conducted in the device comprises steam reforming of a hydrocarbon to produce an output stream enriched in hydrogen (col. 7, lines 43-50). Shah fails to teach wherein said output stream being connected to a hydrogen fuel cell, and wherein said control comprises at least one sensor selected from the group consisting of hydrogen sensors and fuel cell electrical output sensors, each such sensor being connected to control logic circuitry for passing an output signal to such control logic circuitry, said control logic circuitry producing an output signal for operating said valve in response to said output signal. Hoch teaches an apparatus comprising a fuel processor/reformer (Figure 1, 112) generating hydrogen (120), a combustor (130) generating heat for the fuel processor/reformer (112), wherein the output/(hydrogen) (120) of the device/fuel processor (112) is controlled by selectively controlling the valves/(fuel, oxidant valves); wherein said output stream (hydrogen) being connected to a hydrogen fuel cell (122) (as illustrated), and wherein said control comprises at least one sensor selected from the group consisting of hydrogen sensors and fuel cell electrical output sensors (Page 3, paragraph [0027], lines 1-10), each such sensor being connected to control logic/software circuitry for passing an output signal to such control logic circuitry, said control logic circuitry producing an output signal for operating said valve in response to said output signal in order to control the operation of the power system (100) (Page 3, paragraph [0027]).

It would have been obvious to one having ordinary skill in the art at the time of the invention to connect the output stream (hydrogen) to a hydrogen fuel cell, and to provide a controller that comprises at least one sensor selected from the group consisting of hydrogen sensors and fuel cell electrical output sensors, each such sensor being connected to control logic/software circuitry for passing an output signal to such control logic circuitry, said control logic circuitry producing an output signal for operating said valve in response to said output signal in Shah's apparatus, as taught by Hoch, in order to control the operation of the power system.

With respect to claim 12, Shah discloses all claim limitations as set forth above but fails to teach wherein the controller further includes a sensor for providing an output and wherein the valve is operated based on the sensor output. Hoch teaches an apparatus comprising a fuel processor/reformer (Figure 1, 112) generating hydrogen (120), a combustor (130) generating heat for the fuel processor/reformer (112), wherein the output/(hydrogen) (120) of the device/fuel processor (112) is controlled by selectively controlling the valves/(fuel, oxidant valves); wherein said output stream (hydrogen) being connected to a hydrogen fuel cell (122) (as illustrated), and wherein said control comprises at least one sensor selected from the group consisting of hydrogen sensors and fuel cell electrical output sensors (Page 3, paragraph [0027], lines 1-10), in order to control the operation of the power system (100) (Page 3, paragraph [0027]).

It would have been obvious to one having ordinary skill in the art at the time of the invention to have the controller further include a sensor for providing an output and

Art Unit: 1723

wherein the valve is operated based on the sensor output in Shah's apparatus, as taught by Hoch, in order to control the operation of the power system.

14. Claim 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shah et al. (US 7,108,730) in view of Hoch et al. (US 2006/0052916 A1), as applied to claim 9 above, and further in view of Hamrick et al. (US 4,024,912).

With respect to claim 18, modified Shah discloses all claim limitations as set forth above but fails to teach wherein the valves are actuated by an actuation selected from the group consisting of shaped memory alloy actuation, piezoelectric actuation, thermo pneumatic actuation, electrostatic actuation and actuation by temperature changes of a junction of two dissimilar metals. However, it is well known in the art to have the valves actuated by an actuation selected from the group consisting of shaped memory alloy actuation, piezoelectric actuation, thermo pneumatic actuation, electrostatic actuation and actuation by temperature changes of a junction of two dissimilar metals, as evidenced by Hamrick (col. 11, lines 65 – col. 12, lines 1-11). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to have the valves of modified Shah be actuated by an actuation selected from the group consisting of shaped memory alloy actuation, piezoelectric actuation, thermo pneumatic actuation, electrostatic actuation and actuation by temperature changes of a junction of two dissimilar metals, as it is well known in the art to do so, as evidenced by Hamrick et al.

Art Unit: 1723

15. Claim 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shah et al. (US 7,108,730), as applied to claim 3 above, and further in view of Hatoh et al. (US 2006/0251943).

With respect to claim 19, Shah discloses all claim limitations as set forth above but fails to teach wherein at least one end block comprises a plurality of laminates having channels therein for communicating fluids to and from the reactors of each of a plurality of subsystem modules. Hatoh teaches a power generation apparatus comprising subsystem modules/(cathode and anode of a fuel cell), and a first fluid supply manifold (204) within laminate (302), and a second fluid supply manifold (205) and a second fluid discharge manifold (206) corresponding to oxidizing gas supply manifold (4) in order to provide a flow path for process fluids (Page 11, paragraph [0171]) (Abstract).

It would have been obvious to one having ordinary skill in the art at the time of the invention to provide at least one end block comprising a plurality of laminates having channels therein in Shah's apparatus, as taught by Hatoh, in order to provide a flow path for process fluids. Though Hatoh uses one laminate, one skilled in the art can choose to include a plurality of laminates, as providing a "plurality of laminates" are mere duplication of parts: *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960) It has been held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced). MPEP 2144.06B.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAITY V. HANDAL whose telephone number is (571)272-8520. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Neckel Alexa can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KAITY V. HANDAL/
Examiner, Art Unit 1723

11/17/10
